

I am making a lever to lift a piano onto my roof. The effort arm is 30m, and the load arm is 2 m.

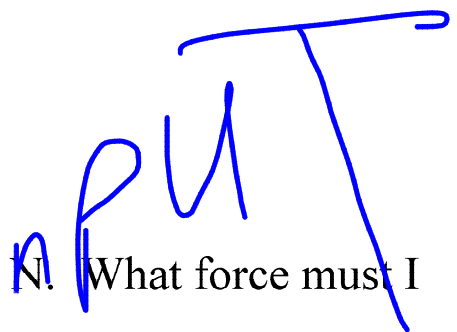
What is the mechanical advantage?

$$M.A. = \frac{\text{Effort arm length}}{\text{Load arm length}}$$
$$= \frac{30}{2}$$
$$= 15$$

The piano exerts a downward force of 1500 N. What force must I apply to lift the piano?

$$1500/15 = 100$$

output



I am pushing a bus. I exert 1000N of force and the bus moves 2m.
How much work did I do?

$$Work = f \times D$$

$$= 1000 \text{ N} \times 2 \text{ m}$$

$$= 2000 \text{ N} \cdot \text{m}$$

I know I did 1000 N.m of work, and I know moved my cat 200m.
How much force did I exert?

$$F = \frac{W}{D} = \frac{1000}{200} = 5 \text{ N}$$

I used a pulley to lift a friend. I pulled 10m of rope and the friend raised 5m

What is the MA? $MA = \frac{\text{input distance}}{\text{output distance}}$
 $= 10 \div 5$
 $= 2$

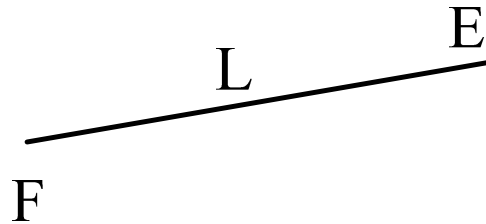
My system turns an input force of 5N into an output force of 25N.

What is the MA $MA = \frac{\text{output force}}{\text{input force}}$
 $= 25 \div 5$
 $= 5$

Class 1



Class 2



Class 3

